Appeal decision

Appeal No. 2019-1026

Appellant California Institute of Technology

Patent Attorney SUGIMURA, Kenji

The case of appeal against the examiner's decision of refusal of Japanese Patent Application No. 2016-560721, entitled "SYSTEM AND METHOD FOR IMPLEMENTING BULK METALLIC GLASS-BASED WAVE GEAR DEVICE AND WAVE GEAR DEVICE COMPONENT" (International Publication filed on October 15, 2015, International publication No. WO2015/156797, national publication of the translated version on June 8, 2015, National Publication of International Patent Application No. 2017-515059) has resulted in the following appeal decision.

Conclusion

The appeal of the case was groundless.

Reason

No. 1 History of the procedures

The application was originally filed on April 9, 2014 (Heisei 26) as an International Patent Application, and a notice of reasons for refusal was issued on February 15, 2018; despite submission of a written opinion and written amendment on August 17, 2018, an examiner's decision of refusal was issued on September 28, 2018. Against this, an appeal against the examiner's decision of refusal was demanded on January 25, 2019, and a written amendment to amend the Scope of Claims was simultaneously submitted.

No. 2 Decision to dismiss the amendment on January 25, 2019

[Conclusion of Decision to Dismiss Amendment]

The written amendment dated January 25, 2019 shall be dismissed.

[Reason]

1. The Amended Invention

The written amendment dated January 25, 2019 (hereinafter, referred to as "the

Amendment") makes an amendment to Claims 1, 10 and 16 of the Scope of Claims, and the descriptions before and after amendment are as follows.

The underlines indicate amended parts

(1) The descriptions of Claims 1, 10, and 16 before the Amendment

"[Claim 1]

A wave gear device comprising:

a wave generator;

a flexspline having a first set of gear teeth; and

a circular spline having a second set of gear teeth,

wherein at least one of the wave generator, the flexspline, the circular spline includes a bulk metallic glass-based material, the bulk metallic glass-based material being thicker than 1 mm and having an elastic limit of 1.4% or more.

[Claim 10]

A wave generator comprising:

a wave generator plug having an elliptical shape cross section; and

a bearing having an inner race, an outer race and a plurality of rolling members,

wherein the wave generator plug is disposed within the bearing, the bearing being able to conform to the elliptical shape of the wave generator plug, and

wherein at least one of the wave generator plug and the bearing comprises a bulk metallic glass-based material.

[Claim 16]

A method of making a wave gear device component comprising a step for molding a bulk metallic glass-based material using one of a thermoplastic forming technique and a casting technique, wherein the bulk metallic glass-based material is molded as one of a wave generator plug, an inner race, an outer race, rolling members, a flexspline, a flexspline without one set of gear teeth, a circular spline, a circular spline without one set of gear teeth, one set of gear teeth to be incorporated into a flexspline, and one set of gear teeth to be incorporated into a circular spline."

(2) The descriptions Claims 1, 10, and 16 after the Amendment

"[Claim 1]

A wave gear device comprising:

a wave generator;

a flexspline having a first set of gear teeth; and

a circular spline having a second set of gear teeth,

wherein at least one of the wave generator, the flexspline, <u>and</u> the circular spline includes a bulk metallic glass-based material, the bulk metallic glass-based material

being thicker than 1 mm and having an elastic limit of 2% or more.
[Claim 10]
A wave generator comprising:
a wave generator plug having an elliptical shape cross section; and
a bearing having an inner race, an outer race, and a plurality of rolling members,
wherein the wave generator plug is disposed within the bearing, the bearing being able to conform to the elliptical shape of the wave generator plug, and
wherein at least one of the wave generator plug and the bearing comprises a bulk metallic glass-based material having an elastic limit of 2% or more.
[Claim 16]
A method of making a wave gear device component comprising a step for molding a bulk metallic glass-based material being thicker than 1 mm and having an elastic limit of 2% or more using one of a thermoplastic forming technique and a casting technique, wherein the bulk metallic glass-based material is molded as one of a wave generator plug, an inner race, an outer race, rolling members, a flexspline, a flexspline without one set of gear teeth, a circular spline, a circular spline without one set of gear teeth, one set of gear teeth to be incorporated into a flexspline, and one set of gear teeth to be incorporated into a circular spline."

2. Propriety of the purpose of the Amendment and existence or nonexistence of addition of new matter

The Amendment limits "a bulk metallic glass-based material" according to Claim 1 before the Amendment, which has been defined as "having an elastic limit of 1.4% or more" to "having an elastic limit of 2% or more," adds a limitation "having an elastic limit of 2% or more" to "a bulk metallic glass-based material" according to Claim 10 before the Amendment, and adds a limitation "having an elastic limit of 2% or more" and a limitation "being thicker than 1 mm" to "a bulk metallic glass-based material" according to Claim 16 before the Amendment. The inventions before and after the Amendment are identical regarding the field of industrial application and the problems to be solved, and thus the purpose of the Amendment is to aim at the restriction of the Scope of Claims stipulated in Article 17-2(5)(ii) of the Patent Act.

Further, the matters added by the Amendment are matters derived from the descriptions of Paragraphs [0042] and [0030] of the Description originally attached to the application of the patent, and the Amendment falls under the provision of Article 17-2(3) of the Patent Act and does not violate the provision of Article 17-2(4) of the Patent Act.

3. Consideration on requirement for independent patentability

As described above, although the amendment regarding Claims 1, 10, and 16 of the Amendment is for the purpose to aim at restriction of the Scope of Claims in Article 17-2(5)(ii) of the Patent Act, we will examine whether or not the invention described in Claim 10 after the Amendment should have been patented independently at the time of filing of the patent application (whether or not it falls under the provision of Article 126(7) of the Patent Act which is applied mutatis mutandis pursuant to the provision of Article 17-2(6) of the Patent Act), as follows.

(1) Amended Invention 10

Amended Invention 10 is recognized as [Claim 10] as described in 1. (2) " The descriptions of Claims 1, 10, and 16 after the Amendment."

(2) Matters described in Cited Document 1 and Cited Invention

Japanese Unexamined Patent Application Publication No. 2013-238278 (hereinafter, referred to as "Cited Document 1") that is cited as "Cited Document 1" in reasons for refusal stated in the examiner's decision, and is a publication distributed before the application was filed, describes the following matters together with drawings.

Additionally, the underlines were applied by the body.

A

"[0035]

FIG. 1 is a front view of a wave gear device according to a first embodiment of the present invention, and FIG. 2 is a sectional view taken along line II-II of FIG. 1.

[0036]

In FIGS. 1 and 2, reference symbol 10 indicates a wave gear device. The wave gear device 10 is a deceleration mechanism (power transmission mechanism) that decelerates input from an actuator (for example, an electric motor, not shown) and outputs a rotation output, and is used for driving a joint portion (not shown) of a humanoid robot, for example.

[0037]

The wave gear device 10 is composed of a flexspline (external gear, hereinafter, referred to as the 'F/S') 12, a wave generator (wave generating device, hereinafter, referred to as the 'W/G') 14 disposed inside the F/S 12, and a circular spline (internal gear, hereinafter, referred to as the 'C/S') disposed outside the F/S 12."

B

"[0040]

The W/G 14 is made of a material having a relatively high yield strength and a relatively low Young's modulus, specifically, metallic glass (for example, Zr-based metallic glass), and like the F/S 12, elastically deformable. The W/G 14 is formed to have a substantially circular tube shape, and a hole 14a having a circular shape in a side view is formed in the center of the W/G 14. The input shaft 22 (the other hand of the input shaft and the output shaft) shown by an imaginary line is inserted and connected to the hole 14a.

[0041]

A space 14b is formed inside the W/G 14; to be precise, inside the W/G 14 and at a position close to the outer peripheral surface, and a medium 24 whose pressure is adjustable is enclosed in the space 14b.

The medium 24 is made of an incompressible material (e.g. gel, liquid rubber, oil, silicone rubber, colloid solution (sol), etc.).

[0042]

The W/G 14 is deformed (deflected) into a non-circular shape (specifically, an elliptical shape) as shown in FIG. 1 by adjusting the pressure of the medium 24 in the space 14b. The space 14b of the W/G 14 and the deformation of the W/G 14 will be described in detail later."

C

"[0045]

A thin and flexible ball bearing 26 is interposed between the F/S 12 and the W/G 14. As shown in FIG. 1, the F/S 12 is deformed (deflected) into a shape (that is, an elliptical shape) conforming to the shape of the W/G 14 by the above-described deformation of the W/G 14, and thereby the teeth 12d are partially engaged with the teeth 16a of the C/S16. ...(remainder omitted)..."

D

"[0086]

Further, since the W/G 14 is configured to be manufactured from metallic glass, specifically, is configured to be manufactured by replacing the general metallic material with metallic glass, Young's modulus can be reduced to about 1/3 while maintaining the strength of the W/G 14, and thus even when the medium 24 has a relatively low pressure, the W/G 14 can be deformed into an appropriate shape. In other words, it is possible to set the predetermined value P1 in the flow chart of FIG. 7 to a relatively low value."

Further, according to the above descriptions and illustrated contents, the

following matters are recognized.

E

It is a matter of technical common sense that a ball bearing is composed of an inner ring, an outer ring, and a plurality of balls, and according to [FIG. 1] and [FIG. 2], it can be seen that the flexible ball bearing 26 is composed of the inner ring, the outer ring, and the plurality of balls.

F

It is recognized that the wave generator 14 is disposed in the ball bearing 26, according to the description "A wave generator (wave generator, hereinafter, referred to as the "W/G") 14 disposed inside the F/S 12" of Paragraph [0037] of A above, the description "A thin and flexible ball bearing 26 is interposed between the F/S 12 and the W/G 14" of Paragraph [0045] of C above, and the descriptions of [FIG. 1] and [FIG. 2].

G

It is recognized that the flexible ball bearing 26 can conform to the elliptical shape of the wave generator 14, according to the description "A thin and flexible ball bearing 26 is interposed between the F/S 12 and the W/G 14. As shown in FIG. 1, the F/S 12 is deformed (deflected) into a shape (that is, an elliptical shape) conforming to the shape of the W/G 14 by the above-described deformation of the W/G 14" of Paragraph [0045] of C above, and the description of [FIG. 1]. Further, it is recognized that the wave generating device is composed of a wave generator 14 and a ball bearing 26.

According to the described matters of A to D above, the recognized matters of E to G above, and the illustrated contents of [FIG. 1] and [FIG. 2], it is recognized that Cited Document 1 describes the following invention (hereinafter, referred to as "Cited Invention 1").

[Cited Invention 1]

"A wave generator comprising:

a wave generator 14 having an elliptical shape cross section; and

a ball bearing 26 having an inner ring, an outer ring, and a plurality of balls,

wherein the wave generator 14 is disposed within the ball bearing 26, the ball bearing 26 being able to conform to the elliptical shape of the wave generator 14, and

wherein the wave generator 14 is made of a metallic glass."

(3) Comparison / judgment

Amended Invention 10 and Cited Invention 1 are compared.

"A wave generator 14" of the latter corresponds to "a wave generator plug" of the former.

"An inner ring", "an outer ring," and "a plurality of balls" of the latter respectively correspond to "an inner race," "an outer race," and "a plurality of rolling members" of the former, and "a ball bearing 26" of the latter corresponds to "a bearing" of the former.

The matter that "the wave generator 14 is made of a metallic glass" of the latter and the matter "at least one of the wave generator plug and the bearing comprises a bulk metallic glass-based material having an elastic limit of 2% or more" of the former are common as long as the matter "at least one of the wave generator plug and the bearing comprises a bulk metallic glass-based material".

"A wave generator" of the latter comprising "a wave generator 14" and "a ball bearing 26" corresponds to "a wave generator" of the former.comprising "a wave generator plug" and "a bearing"

As a consequence, a corresponding feature and a different features of them are as follows.

[Corresponding Feature 1]

"A wave generator comprising:
a wave generator plug having an elliptical shape cross section; and
a bearing having an inner race, an outer race, and a plurality of rolling members,
wherein the wave generator plug is disposed within the bearing, the bearing being able to conform to the elliptical shape of the wave generator plug, and
wherein at least one of the wave generator plug and the bearing comprises a metallic glass-based material".

[Different Feature 1]

In Amended Invention 10, a metallic glass-based material included in at least one of the wave generator plug and the bearing is specified as "a bulk metallic glass-based material having an elastic limit of 2% or more," whereas in Cited Invention 1, a metallic glass forming the wave generator 14 is not specified so.

Different Feature 1 above is examined as follows.

[Regarding Different Feature 1]

Cited Document 1 describes "The W/G 14 is made of a material having a relatively high yield strength and a relatively low Young's modulus, specifically, metallic glass (for example, Zr-based metallic glass)" (see Paragraph [0040] of (2) B above).

The appellant explains about “elastic limit” used in the application in the written

demand for appeal (the latest clause stage of "5. (4)"), and considering the explanation together with the descriptions of Paragraphs [0040] to [0042] used in the description, it is recognized that " elastic limit" of Amended Invention 10 corresponds to a limit point above which permanent deformation of the material occurs (yield occurs), and corresponds to "yield strength" in the description of Cited Document 1.

Then, it can be said that Cited Document 1 discloses that a metallic glass forming the wave generator 14 of Cited Invention has a relatively high elastic limit, and here it is merely the optimization of the numerical range to make the elastic limit of the metallic glass "2% or more," which is considered to be relatively high, and it can be said that it would have been easily made by a person skilled in the art.

Further, regarding "bulk metallic glasses," the description of the application describes that "however, later, special alloy compositions were developed that were more resistant to crystallization, which allowed metallic glasses to be formed at a much slower cooling rate, and thus to be made considerably thicker (e.g. thicker than 1 mm). These thicker metallic glasses are known as 'bulk metallic glasses' ('BMGs')" (see Paragraph [0030]), and according to the description, it is recognized that metallic glass that can be produced to a certain size is called "bulk metallic glass," such as "thicker than 1 mm" as an example.

Against this, according to the description "the wave gear device 10 is a deceleration mechanism (power transmission mechanism) that decelerates input from an actuator (for example, an electric motor, not shown) and outputs a rotation output, and is used for driving a joint portion (not shown) of a humanoid robot, for example" of Cited Document 1 (see Paragraph [0036] of (2) A above), since it is recognized that the wave generator 14 of Cited Document 1 configuring the wave gear device 10 can have a thickness of about 1 mm, seeing from its use, it is recognized the metallic glass forming the wave generator 14 is considered to be "bulk metallic glass."

Even if the metallic glass forming the wave generator 14 of Cited Invention 1 is not "bulk metallic glass," bulk metallic glass itself was well known before the filing of the application (if necessary, see Paragraphs [0002] to [0004] of Japanese Unexamined Patent Application Publication No. 2007-247037, and Paragraphs [0003] to [0004] of Japanese Unexamined Patent Application Publication No. 2012-162805), and it can be said that a person skilled in the art could have easily conceived to use bulk metallic glass for the metallic glass of the wave generator 14 of Cited Invention 1, seeing from its use.

Comprehensively considering the above mentioned matters, it can be said that a person skilled in the art could have easily make Amended Invention 10 relating to

Different Feature 1 from Cited Invention 1.

Furthermore, the term "bulk metallic glass" per se of Amended Invention 10 is recognized as meaning bulk metallic glass as described above, and no significant difficulty is recognized in using this term.

In addition, considering the effect exerted by Amended Invention 10, it can be predicted from Cited Invention 1, or Cited Document 1 and well-known matters, and is not remarkable.

Therefore, Amended Invention 10 could have been easily made by a person skilled in the art, on the basis of Cited Invention 1 or on the basis or Cited Invention 1 and well-known matters, and the appellant should not have been granted a patent for it independently at the time of patent application under the provision of Article 29(2) of the Patent Act.

(4) Closing

As described above, since the Amendment violates the provision of Article 126(7) of the Patent Act which is applied mutatis mutandis in the provision of Article 17-2(6) of the Patent Act, the Amendment shall be dismissed under the provision of Article 53(1) of the Patent Act applied mutatis mutandis by replacing certain terms pursuant to Article 159(1) of the Patent Act.

No. 3 Regarding the Invention

1. Inventions 10 and 12

As the Amendment was dismissed as above, the inventions relating to Claims 10 and 12 of the application (hereinafter, referred to as "Invention 10" and "Invention 12") are recognized as follows, as specified by the matters described in Claims 10 and 12 according to the Scope of Claims for patent amended by the written amendment submitted on August 17, 2018.

"[Claim 10]

A wave generator comprising:

a wave generator plug having an elliptical shape cross section; and

a bearing having an inner race, an outer race, and a plurality of rolling members,

wherein the wave generator plug is disposed within the bearing, the bearing being able to conform to the elliptical shape of the wave generator plug, and

wherein at least one of the wave generator plug and the bearing comprises a bulk

metallic glass-based material.
[Claim 12]
A flexspline comprising a flexible body defining a circular shape, wherein an outer periphery of the circular shape defines one set of gear teeth, and the flexible body includes a bulk metallic glass-based material."

2. Reasons for refusal stated in the examiner's decision

The reasons for refusal stated in the examiner's decision is that the inventions relating to Claims 1 to 20 of the application are such that could have easily invented by a person skilled in the art on the basis of the invention described in Cited Document 1 or 2 or 3 and the matters described in Cited Documents 4 to 6 distributed or available to public over an electric communication network, in Japan or abroad before the application was filed, and thus, the appellant should not be granted a patent for the inventions in accordance with the provision of Article 29(2) of the Patent Act.

Cited Document 1. Japanese Unexamined Patent Application Publication No. 2013-238278
Cited Document 2. Japanese Unexamined Patent Application Publication No. 2007-40518
Cited Document 3. Japanese Unexamined Patent Application Publication No. 2007-40517
Cited Document 4. International Publication No. WO2012/147559
Cited Document 5. Japanese Unexamined Patent Application Publication No. 2007-247037
Cited Document 6. Japanese Unexamined Patent Application Publication No. 2008-264865

3. Matters described in the Cited Document and the Cited Invention
(1) Matters described in Cited Document 1 and Cited Invention 1

The matters described in Cited Document 1 cited in the reasons for refusal stated in the examiner's decision and Cited Document 1 are as described in "No. 2 3. (2) above".

(2) Matters described in Cited Document 3 and Cited Invention 3

Cited Document 3 cited in the reasons for refusal stated in the examiner's decision describes the following matters with drawings.

A

"[0002]

The harmonic reducer includes a cup type, a top hat type, and a flat type, depending on the shape of the flexible external gear incorporated therein. FIG. 1 shows a typical example conventionally proposed for a cup-type harmonic reducer (see, for example, Patent Document 1).

FIG. 1 is a side sectional view showing an outline of a cup type harmonic reducer, and FIG. 2 is a front view thereof. The harmonic reducer 1 has an annular rigid internal gear 2, a cup-shaped flexible external gear 3 arranged inside the gear, and an elliptical wave generator 4 fitted inside the gear. The flexible external gear 3 includes a cylindrical body portion 31, a cylindrical tooth portion 30 in which external teeth 34 continuous to one end of the body portion 31 are formed, an annular diaphragm 32 which seals the other end of the body portion 31, and a boss 33 integrally formed in the center of the diaphragm 32.

[0003]

The flexible external gear 3 is bent into an elliptical shape by the wave generator 4, ... (Omitted) ...

[0004]

As described above, since the described harmonic reducer is used in a drive device such as a robot, it must be improved in durability and reduced in weight. Especially when it is used for a robot arm or a robot hand, for long-term stable driving and improvement of durability from the viewpoint of reliability, and since the weight of the harmonic reducer itself becomes a load when the robot operates, weight reduction is required also from the aspect of considering the environment such as low power consumption. Application of alloy steel and surface nitriding treatment have been proposed for improving durability (see, for example, Patent Document 1). Meanwhile, as an example corresponding to the weight reduction, it has been proposed to replace the constituent members with a normal aluminum alloy (see, for example, Patent Document 2).

[0005]

However, in the conventional methods for improving durability and reducing weight, there are problems that complicated processing is required and that a large number of manufacturing steps must be taken. As a measure for solving these problems, a method of welding a plurality of members has been proposed (see, for example, Patent Document 3).

... (Omitted) ...

[Problem to be solved by the invention]
[0006]

However, in the conventional method of manufacturing by welding, the welded portion becomes weak in strength and there is a problem in durability. In addition, weight reduction and processability are not yet satisfactory.

Therefore, in view of this point, it is an object of the present invention to provide a harmonic reducer harmony that has been improved in durability and reduced in weight and that facilitates manufacturing while providing a transmission torque similar to that of a harmonic reducer in which a flexible external gear is conventionally made of special steel.

[Means for solving the problem]
[0007]

In order to solve the above problems, the present invention is configured as follows.

In the invention according to Claim 1, in a harmonic reducer that has an annular rigid internal gear, a flexible external gear arranged inside thereof, and a wave generator arranged further inside thereof, the flexible external gear including a cylindrical body portion that is deformable in the radial direction and has flexibility, a cylindrical tooth portion in which external teeth continuous to one end of the body portion are formed, an annular diaphragm extending in the radial direction continuously at the other end of the body portion, and a boss continuous with the diaphragm, the flexible external gear is formed by drawing or extrusion.

... (Omitted) ...

In the invention according to Claim 9, the flexible external gear is made of a metallic glass having an elastic strain of 0.015 to 0.03 obtained by dividing tensile strength by elastic modulus and a tensile strength of 750 MPa or more.

In the invention according to Claim 10, the metallic glass contains zirconium in an amount of 5 to 60% by mass, and nickel is contained in the residual.

[Advantage of the Invention]
[0008]

According to the inventions described in Claims 1, 7, and 8, since the flexible external gear is processed by hot drawing or extrusion, the number of manufacturing steps can be reduced and manufacturing can be facilitated.

... (Omitted) ...

According to the inventions described in Claims 9 and 10, the flexible external gear is made of metallic glass that has light weight and high durability and can be

processed by cold drawing or extrusion. Therefore, manufacturing can be facilitated."
B
"[0010]

FIG. 1 and 2 show a cup-type harmonic reducer using the present invention. Since the shape is the same as the conventional one, the description of the reference symbols of the respective parts will be omitted. The annular rigid internal gear 2, the wave generator 4, and other parts are manufactured by the same method as the conventional one.

In the manufacturing method of the flexible external gear 3, the cup outer diameter dimension of the flexible external gear 3 was 45 mm, ... (Omitted)... Further, two kinds of plate materials, #9 and #10, were used as the material of the plate material as metallic glass, and it was formed by the cooling deep drawing method. The metallic glass used had an elastic strain of 0.015 to 0.03 obtained by dividing the tensile strength by the elastic modulus. Numerical values represent mass% of alloy components."

According to the described matters mentioned above and [FIG. 1], it is recognized that Cited Document 3 discloses the following invention (hereinafter, referred to as "Cited Invention 3").

[Cited Invention 3]

"A cup-shaped flexible external gear 3 comprising a cylindrical body portion 31 having flexibility, and a cylindrical tooth portion 30 in which external teeth 34 continuous to one end of the body portion 31 are formed, is configured by a metallic glass."

4. Comparison / Judgment

(1) Regarding Invention 10

Invention 10 is an invention omitting the limitation "having an elastic limit of 2% or more" relating to the bulk metallic glass-based material, from Amended Invention 10 examined in "No. 2 3." above.

Then, Amended Invention 10 including all invention-specifying matters of Invention 10, as described in "No. 2 3. (3)" above, could have been easily invented by a person skilled in the art, on the basis of Cited Invention 1 or on the basis of Cited Invention 1 and well-known matters, and thus also Invention 10 could have been easily invented by a person skilled in the art, on the basis of Cited Invention 1 or on the basis of Cited Invention 1 and well-known matters.

(2) Regarding Invention 12

Invention 12 and Cited Invention 3 are compared.

"A cylindrical body portion 31 having flexibility" of the latter corresponds to "a flexible body defining a circular shape" of the former.

"A flexible external gear 3" of the latter corresponds to "a flexspline" of a former.

The configuration in which "external teeth 34 continuous to one end of the body portion 31 are formed" of the latter corresponds to the configuration in which "an outer periphery of the circular shape defines one set of gear teeth" of the former.

The matter that the flexible external gear 3 "is configured by a metallic glass" of the latter and the matter that "the flexible body includes a bulk metallic glass-based material" of the former are common as long as the matter "the flexible body includes a bulk metallic glass-based material".

As a consequence, a corresponding feature and a different feature of them are as follows.

[Corresponding Feature 2]

"A flexspline comprising a flexible body defining a circular shape, wherein an outer periphery of the circular shape defines one set of gear teeth, and the flexible body includes a bulk metallic glass-based material".

[Different Feature 2]

Regarding "metallic glass-based material," Invention 12 specifies that the flexible body includes "bulk metallic glass-based material," whereas, in Cited Invention 3, the flexible external gear 3 is configured by metallic glass.

Different Feature 2 above is examined as follows.

[Regarding Different Feature 2]

Regarding "bulk metallic glass," according to the description of Paragraph [0030] of the Description of the application, it is recognized that a metallic glass that can be produced to a certain size is called "bulk metallic glass" such as "thicker than 1 mm" as an example.

Against this, according to the description "as described above, since the described harmonic reducer is used in a drive device such as a robot, it must be improved in durability and reduced in weight. Especially when it is used for a robot arm or a robot hand, ..."(see Paragraph [0004] of 3. (2) A above), and the description "the cup outer diameter dimension of the flexible external gear 3 was 45 mm" (see 3. (2) B above) of Cited Document 3, since it is recognized that the flexible external gear 3 of Cited Document 3 configuring the harmonic reducer has a thickness of about 1 mm,

seeing from its use and external dimensions, it is recognized the metallic glass forming the flexible external gear 3 is considered to be "bulk metallic glass".

Even if the metallic glass forming flexible external gear 3 of Cited Document 3 is not "bulk metallic glass," bulk metallic glass itself was well known before the filing of the present application (if necessary, see Paragraphs [0002] to [0004] of Japanese Unexamined Patent Application Publication No. 2007-247037, and Paragraphs [0003] to [0004] of Japanese Unexamined Patent Application Publication No. 2012-162805), and it can be said that a person skilled in the art could have easily conceived to use a bulk metallic glass for the metallic glass of the flexible external gear 3 of Cited Document 3, seeing from its use and external dimensions.

Therefore, it can be said that a person skilled in the art could have easily make Invention 12 relating to Different Feature 2 from Cited Invention 3.

In addition, considering the effect exerted by Invention 12, it can be predicted from Cited Invention 3, or the matter described in Cited Document 3 and well-known matters, and is not remarkable.

Therefore, Invention 12 could have easily invented by a person skilled in the art on the basis of Cited Invention 3, or based on Cited Document 3 and well-known matters.

5. Addition

Even if Amended Invention 10 meets independent patentability requirements and the Amendment should not be dismissed, the Amendment does not amend Claim 12. There is no change in the invention according to Claim 12 before and after the Amendment.

Accordingly, even if the Amendment is approved, the judgment on the invention according to Claim 12 after the Amendment is the same as the judgment on Invention 12.

6. Closing

As described above, the invention according to Claim 10 of the application (Invention 10) could have easily been invented by a person skilled in the art on the basis of Cited Invention 1, or based on Cited Document 1 and well-known matters, and thus, the appellant should not be granted a patent for the inventions in accordance with the provision of Article 29(2) of the Patent Act.

Further, the invention according to Claim 12 of the application (Invention 12)

could have easily been invented by a person skilled in the art on the basis of Cited Invention 3, or based on Cited Document 3 and well-known matters, and thus, the appellant should not be granted a patent for the inventions in accordance with the provision of Article 29(2) of the Patent Act.

Even if the Amendment should not be dismissed and is approved, the invention according to Claim 12 after the Amendment is equal to Invention 12, so that for the same reason as for Invention 12, the appellant should not be granted a patent for the Invention under the provision of Article 29(2) of the Patent Act.

Accordingly, the application should be rejected without examining inventions relating to the other claims of the application.

Therefore, the appeal decision shall be made as described in the conclusion.

December 11, 2019

Chief administrative judge: OMACHI, Masayoshi
Administrative judge: HIRATA, Nobukatsu
Administrative judge: UCHIDA, Hiroyuki